

Amendment of 8/22/03, Appl'n. 09/708,658, GAU 3724

REMARKS

[3] Claims 1-3 were rejected over Jones '337 in view of Carr. This rejection is respectfully traversed.

(1) The Examiner points to Jones' disclosure of ion bombardment etching and asserts that Carr also discloses ion bombardment etching. The Applicant disagrees because Carr discloses etching in a dilute HF bath, or plasma assisted chemical etching (PACE), for the purpose of exposing sub-surface defects. These etches are disclosed on the second and third text pages. No disclosure of etching by ion bombardment is seen by the Applicant, and the Examiner is requested to provide a citation if he maintains that Carr also discloses ion bombardment etching.

(2) The chemical processes used by Carr actually *increase* the roughness; this is shown by Table I on the sixth text page. "A sharp increase in roughness is noted as the surface is etched from 0 to 80 nm," writes Carr just above Table I, and on the following page adds, "Further etching causes additional roughening." Since Jones is sharpening a blade with its ion bombardment etching, not testing like Carr, and the person of ordinary skill would not have substituted Carr's chemical process that increases the surface roughness and therefore decreases sharpness.

It is noted that Jones teaches chemical etching as a step preliminary to ion bombardment. Chemical etching is disclosed starting at column 2, line 44. Jones states at column 3, line 23, that "A combination of abrasive methods and

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chemical methods may be used to form the desired *shape* of cutting edge" (emphasis added), and at column 3, line 45, explains, "One of the above described methods may be used to form the desired finished cutting edge. However, a final shaping and finishing can be provided, for example, by ion bombardment." Jones teaches away from chemical etching as a final step in sharpening a blade.

(3) Carr is from the area of testing optical surfaces and has no disclosed relationship to blades, and the Applicant sees no teaching about optical surfaces in Jones. It is the Applicant, not Jones or Carr, who relates optical surfaces and blades. It is the Applicant, not the person of ordinary skill, who saw the relationship.

(4) The Examiner points out the surface roughnesses disclosed in Table II on the last page of Carr. With respect, this data relates to diamond-turned optical surfaces (see preceding page) which have been etched by Carr's chemical methods. There is no relationship to ion bombardment, or the blade of Jones. It is noted that Table II, like Table I, also discloses that Carr's processes increase the roughness.

(5) Claim 1 now recites that the plate is of harder material than the substrate. Carr discloses no plating material, while Jones uses alumina for the substrate and discloses a coating of chromium on the alumina at column 5, line 12, as noted by the Examiner. But chromium is not harder than alumina, and there is no anticipation of the new feature. The Examiner is referred to the

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attached photocopies from a dictionary and the Handbook of Chemistry and Physics.

Alumina is another name for corundum or aluminum oxide (dictionary). Alumina defines the hardness of 9 on the Mohs scale of hardness, and the Mohs hardness of chromium is 9.0 (handbook), exactly the same as the alumina substrate. On the Knoop scale of hardness, the hardness of alumina is 2100 and the hardness of chromium is 935 (handbook). Thus on one hardness scale there is no difference in hardness, while on the other scale the substrate is more than twice as hard as the coating.

As there is no disclosure of the feature now claimed in either reference, no combination would reach the claims even if the combination were obvious (not admitted).

The other coatings disclosed by Jones, such as polymer, are not harder than the alumina substrate. The Applicant respectfully traverses the Examiner's characterization of polymer as "hard" and requests a citation in support if the Examiner is to maintain that polymer might be harder than alumina.

(6) Claim 1 as amended recites the plate extending to the cutting edge on a single side of the blade. This is not disclosed by Jones, which presents the formation and sharpening of the blade as steps preliminary to coating. The Applicant sees no disclosure of the coatings being formed on a single side of the blade. Jones says that the coatings are applied "in the vicinity of the cutting edge" (column 5, line 9), but that does not imply the Applicant's feature.

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(7) The Applicant sees no disclosure of the subject matter of claim 2, and the Examiner has not pointed out where in the references that subject matter might be.

[4] Claim 4 was rejected over Jones '337 in view of Carr and Lane. This rejection is respectfully traversed. The Applicant assumes that the Examiner meant Lane et al. '379, not Lane '329.

Lane '379 teaches glass for a coating, not for a substrate, and therefore does not anticipate claim 4. It is noted that Lane et al. teaches against the new feature of claim 1, that the plate extends to the cutting edge on a single side of the blade.

[5] Claim 5 was rejected over Jones '337 in view of Carr and Lane. This rejection is respectfully traversed on the grounds above relating to the base claim, and on the further grounds that Jones discloses polymer is for lubricity, and substituting ceramic for the polymer would not improve lubricity.

[6] Claim 6 was rejected over Jones '337 in view of Carr and Fischbein '342. This rejection is respectfully traversed on the grounds above relating to the base claim, and on the further grounds that the thickness of a polymer layer is immaterial to any hard layer such as a chromium layer, so there is no teaching toward the Applicant's claims.

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Allowance of all claims under consideration is respectfully solicited.

Respectfully submitted,

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AUG 22 2003

GROUP 3700

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Attachment (**FOUR PAGES**): Pages from dictionary and handbook.

I hereby certify that this correspondence is being facsimile transmitted to the Patent and Trademark Office (Fax No. (703) 872-9302) on August 22, 2002.

Nick Bromer (reg. no. 33,478)

Signature *Nick Bromer*

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6 dol/, n. Chem. one of a series of pear-
of earthenware or glass, open at both ends
above the other, for recovering the subli-

manufacture of glass, ceramics, and printing inks, in dyeing, and in medicine as an antacid and in the treatment of ulcers. Also called aluminum hydrate, hydrated alumina.

Al-vér-a (al vér'p), n. a girl's given name, form of Alvirá, Alao, Alvíra.

THE RANDOM HOUSE DICTIONARY of the ENGLISH LANGUAGE

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TENSILE STRENGTH OF METALS

(Selected from Smithsonian Tables.)
Given in pounds per square inch. The values can be considered only as approximations.

Metal	Tensile Strength in lbs. per sq. in.
Aluminum wire.....	30000-40000
Brass wire.....	50000-160000
Brass wire, phosphor, hard drawn.....	110000-150000
Brass wire, silicon, hard drawn.....	85000-100000
Brass.....	60000-75000
Cobalt.....	33000
Copper wire, hard drawn.....	60000-70000
Copper wire, soft.....	40000-50000
Cold wire.....	20000
Iron, cast.....	13000-35000
Iron wire, hard drawn.....	80000-120000
Iron wire, annealed.....	50000-60000
Lead, cast.....	2600-3800
Lead, cast or drawn.....	23000
Magnesium, hard drawn.....	80000-100000
Magnesium, cold drawn.....	165000
Metal mesh.....	39000
Nickel, hard drawn.....	50000
Palladium.....	45000
Phosphorus wire.....	30000
Silver wire.....	40000-50000
Steel.....	45000
Steel wire, maximum.....	85000
Steel, specially treated nickel steel.....	357000-391000
Steel, piano wire, 0.033 in. diam.....	325000-357000
Steel, piano wire, 0.051 in. diam.....	150000
Tungsten.....	4000-5000
Tungsten, cast or drawn.....	590000
Tungsten, hard drawn.....	7000-12000
Zinc.....	22000-30000
Zinc, cast.....	
Zinc, drawn.....	

HARDINESS

MUSE' SCALE OF HARDNESS	
1 Talc	8 Topaz
2 Rock salt or gypsum	9 Corundum
3 Calcite	10 Diamond
4 Fluorite	
5 Apatite	
6 Feldspar	

7 Quartz			HARZBURG OF MATERIALS		
Apate.	6-7	Calcite	3	15	
Amphibolite	2-5	Calcium	10-10	5	
Amphibolite	2-5	Carbon	9-10	10	
Amphibolite	2-5	Carbonadium	0.2	5-5	
Amphibolite	2-5	Cesium	9-10	2-5	
Amphibolite	2-5	Chromium	10	5	
Amphibolite	2-5	Copper	10	5	
Amphibolite	2-5	Corundum	10	5	
Amphibolite	2-5	Diamond	10	5	
Amphibolite	2-5	Diopside	10	5	
Amphibolite	2-5	Dolomite	10	5	
Amphibolite	2-5	Enstatite	10	5	
Amphibolite	2-5	Epilite	10	5	
Amphibolite	2-5	Fluorite	10	5	
Amphibolite	2-5	Gallium	10	5	
Amphibolite	2-5	Germanium	10	5	
Amphibolite	2-5	Gold	10	5	
Amphibolite	2-5	Graphite	10	5	
Amphibolite	2-5	Hydrogen	10	5	
Amphibolite	2-5	Hydroxide	10	5	
Amphibolite	2-5	Iodine	10	5	
Amphibolite	2-5	Iron	10	5	
Amphibolite	2-5	Lead	10	5	
Amphibolite	2-5	Lithium	10	5	
Amphibolite	2-5	Magnesium	10	5	
Amphibolite	2-5	Manganese	10	5	
Amphibolite	2-5	Mercury	10	5	
Amphibolite	2-5	Nickel	10	5	
Amphibolite	2-5	Platinum	10	5	
Amphibolite	2-5	Potassium	10	5	
Amphibolite	2-5	Selenium	10	5	
Amphibolite	2-5	Silver	10	5	
Amphibolite	2-5	Sulfur	10	5	
Amphibolite	2-5	Tellurium	10	5	
Amphibolite	2-5	Vanadium	10	5	
Amphibolite	2-5	Zinc	10	5	

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HARDNESS (Continued)

Indium.	1.3	Pyrite.	0.3
Iridium.	0.6	Quartz.	7
Ruthenium.	2	Rose nit (salite)	2.5
Rhodium.	2.5	Rose metal.	3
Samarium.	1.5	Rubidium.	0.5
Selenium.	0.6	Selenium.	2.0
Silicon.	2.0	Serpentine.	3
Silver.	0	Silicon.	2.5
Silver chloride.	3	Silver.	0
Sodium.	2.5	Silver chloride.	3
Steel.	5	Sodium.	5
Stibite.	2	Steel.	5
Strontium.	4	Stibite.	1
Sulfur.	6	Strontium.	1.5
Talc.	7	Sulfur.	2.5
Tantalum.	4.8	Talc.	1
Tin.	0.5	Tantalum.	1.5
Tungsten.	4	Tin.	2
Uranium.	4.3	Tungsten.	1.3
Vanadium.	6.5	Uranium.	3
Vanadium pentoxide.	0.5	Vanadium.	7.3
Wax (P).	0.5	Vanadium pentoxide.	0.3
Wood & metal.	6	Wax (P).	2
Zinc.	6	Wood & metal.	2
Zinc.	6	Zinc.	2

COMPARISON OF HARDNESS VALUES OF VARIOUS MATERIALS ON MOHS AND KNOOP SCALES.

Compiled by Laurence S. Foster

Substance	Formula	Molar value	Equivalent value
Calcium chloride	CaCl_2	1	32
Silver chloride	AgCl	1	37
Silver nitrate	AgNO_3	1	60
Calcium fluoride	CaF_2	2	119
Copper chloride	CuCl_2	2	135
Calcium phosphate	$\text{Ca}_3(\text{PO}_4)_2$	6	163
Calcium chloride	CaCl_2	2	168
Calcium chloride	CaCl_2	2	270
Calcium chloride	CaCl_2	2	480
Calcium chloride	CaCl_2	2	557
Calcium chloride	CaCl_2	2	536
Calcium chloride	CaCl_2	2	560
Calcium chloride	CaCl_2	2	829
Calcium chloride	CaCl_2	2	985
Calcium chloride	CaCl_2	2	1160
Calcium chloride	CaCl_2	2	1250
Calcium chloride	CaCl_2	2	1340
Calcium chloride	CaCl_2	2	1380
Calcium chloride	CaCl_2	2	1400
Calcium chloride	CaCl_2	2	1500
Calcium chloride	CaCl_2	2	1580
Calcium chloride	CaCl_2	2	1680
Calcium chloride	CaCl_2	2	2000
Calcium chloride	CaCl_2	2	2100
Calcium chloride	CaCl_2	2	2100
Calcium chloride	CaCl_2	2	2410
Calcium chloride	CaCl_2	2	2470
Calcium chloride	CaCl_2	2	2490
Calcium chloride	CaCl_2	2	2500
Calcium chloride	CaCl_2	2	2750

* Acknowledgment is made to N. W. Thibault, Norton Company, Worcester, Massachusetts, for many of Knoop hardness values. Cf. K. F. Geller, "A Study of Ceramics for Nuclear Reactors," *Nuclear Science, Vol. 7, No. 4, Table 1*, pp. 8-9 (Oct. 1950). V. E. Lysaght, *Industriation Hardness Testing*, Reinhold 1949.

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2510 Superior Ave. N. E. Cleveland, Ohio
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